

## **BIO-RESOURCES: EDUCATION, MANAGEMENT AND SUSTAINABILITY**

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### **Abstract**

The term 'biodiversity' is indeed commonly used to describe the number, variety and variability of living organisms. Biodiversity provide a number of services to the mankind mainly in the form of ecological, biological and social benefits. The human wellbeing depend upon biodiversity; bio-resources not only deliver numeral amenities as food, fodder, wood, medicine, raw materials, energy and clean water but also, a source of income generation and jobs through trade, tourism, food production etc. The loss of biodiversity and hence bio-resources and its serious consequence on economic-ecological systems is a critical apprehension. If India is considered, there has been an overall deterioration of floral and faunal species majorly due to human mediated habitat degradation and over exploitation. The problem of preserving bio-resources should be addressed very promptly, and effective ways should be implemented to protect it for the future generation. The monetary values of the services provided by biodiversity and the extent to which it can be refunded should be assessed. It should be recognized that a better understanding of the environment can only come through education, aiming to study the environment and also to mark the use of nature and natural resources in a justifiable way. Students and youths should be involved in activity based learning centred upon reducing consumption and increasing sustainable use of bio-resources.

**Keywords:** *Bio-resources; education; youth; sustainable use.*

### **Introduction**

The word 'biodiversity' is a contraction of biological diversity. The term 'biodiversity' is indeed commonly used to describe the number, variety and variability of living organisms. Biodiversity

provide a number of services to the mankind mainly in the form of ecological, biological and social benefits. The basic needs of humans like food, air, water and shelter are fulfilled by nature. . Large number of species ensures greater variability of crop plants. Moreover, diverse crop species are more adaptable to environmental changes as they are the largest pool of different metabolic traits and pathways. They are effective users of resources over a broad range of environmental conditions (Schlapfer et al 2002). Together with fuel, wood, wild food products are the main source of forest-related income and consumption (Vedeld et al. 2007).

It has been evident that biodiversity provides many free recycling, purification and pest control services. The existence of humans solely depends upon natural processes such as pollination, the absorption of carbon dioxide and renewed oxygen supply by plants and trees. Medicinal plants, non-timber forest products and timbers are the greatest source of income generation for developing countries. Botanic and zoological gardens, ecotourism etc have their greater aesthetic values. Scientists have been looking more and more at nature to reveal how various species work, produce, consume resources and are trying to imitate the whole process that million years of evolution has produced.

Greater biodiversity correlates with a lower disease burden. Presumably, superior biodiversity causes difficulty for human pathogens to survive. For example, if there are more types of birds around, more malaria-carrying mosquitoes will get eaten. The burden of vector-borne and parasitic diseases (VBPDs) rise as biodiversity falls (Bonds et. al.2012).The economic development of a country is also dependent upon biodiversity. At a financial policy stage the remunerations of agro-biodiversity for the poor have been acknowledged in many environment and development literatures (Jackson et al. 2007; Perrings 2001; Perrings et al. 2006; Perrings 2007; Ravi et al. 2006; Smale and Drucker 2008).

International concern about the loss of biodiversity and the serious consequences on economic-ecological systems is a vital concern. As far as India is concerned, there has been an overall deterioration of floral and faunal species majorly due to human mediated habitat degradation and over exploitation. Therefore, the problem of preserving natural resources should be addressed very instantly, and effective ways should be implemented to protect it for the future generation.

The study specifically focuses on the questions: What are the different ways by which biodiversity affect human life? How it act as a service provider? What are the different strategies which could be followed to evaluate this degrading wealth? Where India stands? But before answering the questions, few aspects should be kept in mind like: the requirements of the target groups, making appropriate choice of thought provoking measures, so that the purpose of both conservation and sustainable development is achieved and answering a vital question *viz.* Whether our general education system

satisfactorily designed to combat the challenges? The role of the youth is extensively prominent. They have enormous prospect. The necessity is to kindle and clarify their mind in a more captivating manner.

### **Background of environmental education and sustainability**

Agenda 21 (United Nations 1992), which came out of Rio, has highlighted that environmental education is one of the most imperative approaches for protecting our environment. It emphasized not only on just education through the formal system, but also at all other levels. In addition, environmental education can also play an integrated and pivotal role in conserving biodiversity.

It has been recognized that a better understanding of the environment can only come through environmental education aiming: to study the environment in which species live; interact, grow and survive; to appreciate it; and also to mark use of the nature and natural resources in a justifiable way. Environmental education is learning about the factor, cause and solutions for different environmental crises.

The efforts to include environmental education (EE) in teaching-learning process started way back in the 1960s and environmental concerns formed an integral part of curricula and textbooks. The documents 'Curriculum for the Ten-year School: An Approach Paper (1975)' and 'Curriculum for the Ten-year School: A Framework' (1975) both underlined the need for EE. The National Policy of Education, 1986 identified 'Protection of the environment' as a value. The Policy states: 'There is a paramount need to create a consciousness of the Environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and colleges. This aspect will be integrated in the entire educational process.' The National Council of Educational Training and Research (NCERT) has, in the last three decades, not only developed textbooks and teacher guides incorporating environmental concerns, but also prepared guidelines for preparation of textbooks. The Honorable Supreme Court in December 2003, made environment education compulsory at all levels of education. The curriculum framework prepared by the NCERT has been accepted by the Court as the guideline for state education departments to develop textbooks for schools from 2004-2005 onward. Though integrating environmental concepts into curricula was not a new idea at that time, but the judicial interest in the issue gave it stimulus.

The objectives provided at the 'The *Belgrade Charter* (UNESCO-UNEP, 1976)' and 'Intergovernmental Conference on EE held at Tbilisi (UNESCO, 1978)' have the potential to rescue the world from environmental crises.

The *Belgrade Charter* (UNESCO-UNEP, 1976) was adopted by a United Nations conference,

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and provides a widely accepted statement for environmental education:

*'The goal of environmental education is to develop a world population that is aware of and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.'*

The first Intergovernmental Conference on EE held at Tbilisi (UNESCO, 1978) established the objectives of EE. They are:

- *'Awareness* – to acquire an awareness and sensitivity to the total environment and its allied problems;
- *Knowledge* – to gain a variety of experiences in and acquire a basic understanding of, the environment and its associated problems;
- *Attitudes* – to acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection;
- *Skills* – to acquire the skills for identifying and solving environmental problems; and
- *Participation* – to encourage citizens to be actively involved at all levels in working toward resolution of environmental problems.'

Observation, analysis and innovation are the preliminary principles of any education. It aims ultimately for reaching and manifold behavioral changes in everyday life and at the work place. The guiding principle and pedagogical ideal of environmental education is the environmental responsible consumer, industrial producer, employee, citizen, policy maker, traveler, athlete, tourist and farmers and a human being. Whoever learns ecology develops problem oriented and action oriented capabilities and insights. Environmental education is a lifelong process which begins at preschool level and continues through formal and non-formal educational avenues of life.

## **Methodology**

The research work had been done mostly on the basis of secondary data. The methodology for the review included examination of the peer-reviewed literature, as published in journals and books, and an examination of websites of major organization working on biodiversity conservation (UNEP WCMC; MoEF, GOI; TEEB; CBD; WWF India etc).

## **Result And Discussion**

### **Different strategies to conserve and evaluate the degrading wealth**

The very survival of the human race is dependent on conservation of biodiversity. It is evident that this invaluable heritage is being destroyed at an alarming rate due to several reasons. There are several strategies which are adapted for conservation of biodiversity. Some of these are: Legislation, in-situ conservation, ex-situ conservation, community participation in conservation, recording indigenous knowledge, international conservation strategies and many more. In 2002, The Convention on Biological Diversity adopted a target “to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation [emphasis added] and to the benefit of all life on earth” (SCBD 2002). It was botched as biodiversity is continuously vanishing from earth. Different conservation programmes have also been launched for scientific management and wise use of wetlands, mangroves and coral reef ecosystems.

The annual report on implementing the Millennium Development Goals (MDGs) to the UN General Assembly (UNGA), was submitted by UN Secretary-General Ban Ki-moon in July 2013 and released in mid-August, titled 'A life of dignity for all: accelerating progress towards the MDGs and advancing the UN development agenda beyond 2015,' stresses sustainable development as the "global guiding principle and operation standard" for the post-2015 era. On environmental sustainability, it notes ‘achievements on water and sanitation alongside continued biodiversity loss, increased carbon dioxide (CO<sub>2</sub>) emissions and land degradation and desertification, overexploitation of fish stock, which threaten other achievements and undermine future gains’. Out of the many transformative actions that can bring the emerging vision of MDGs to life, addressing climate change; addressing environmental challenges (including managing fisheries, forests, freshwater resources, oceans and soil and building resilience); promoting sustainable growth are of major significance.

Now the question arises where India stands? The Ministry of Environment and Forests, Government of India, took both way strategies to conserve and evaluate. Firstly, apart from conventional methods of conservation it set up Green Tribunals to cope up environmental related legal issues and secondly, in collaboration with The Economics of Ecosystems and Biodiversity (TEEB) study has initiated a new programme to value the immense wealth of natural resources and biodiversity in India. It has begun the evaluation of its natural capital and ecosystem services in terms of economic value. The following are also considered:

1. ***Greening of formal education and institution and Non formal Environmental Education (EE) a mandate:*** There are 733 universities in India (as per UGC on 03.09.2015). A six months compulsory core module course in environmental studies at the undergraduate level was prepared by expert

committee and compulsorily implemented in all the Universities. Though the course content is proficient and addresses many questions, issues and relevant matters but it lacks real life application.

The content should be comprised of two strategic elements: one is curative and the other preventive and reductive. Moreover student should be involved in activity based learning such as designing projects centered upon biodiversity and the needs of the communities along with the teachers, institutional heads and local community member. Apart from this greening of campus, formulating different strategies to cope up biodiversity challenges as a part of environmental studies should be included and special credits must be awarded to the institute, teacher and students.

Non-formal education, though, is not often prioritized in education systems and many teachers lack the skills and training necessary to provide effective EE experiences. Still non-formal education within the school framework had been an innovative experience. “The National Green Corps programme of the Ministry of Environment and Forests had set up 150 eco-clubs in every district of every state in India, working through a network of NGOs, government departments and schools. The World Wildlife Fund and many other NGOs provide learning opportunities through nature camping. These experiences are catalysts for imparting awareness, knowledge, attitudes and skills among children and youth. The long-standing involvement of NGOs has resulted in the development of large amounts of relevant educational material.”(Joshi, 2005)

The number of children attending school is increasing with the growing population, but low retention proportions during the primary cycle account for a large number of school drop-outs. Efforts should be made to create non-formal centres, street-side classes, and mobile education units for providing opportunities of learning for those children also, many of whom work and live on the streets in very unhygienic conditions.

2. ***Training the trainers:*** Amidst numerous, growing and complex environmental problems, the need for the preparation of world problem solvers is as great as ever. Although there are some good programs to train pre-service and in-service teachers in environmental education, these programs tend to be inconsistently available. CEE in collaboration with the Departments of Education and academic institutions, carry out teacher’s training in EE. In-service and pre-service opportunities for incorporating EE are offered through EE courses and project work. However, rigid and overloaded curricula, time constraints and a conventional approach to teaching still pose a challenge to the integration of EE in formal education. Systemic changes and capacity-building is required to address the issue. Distance education may be considered as an option.

2005-14 was declared by the UN as the Decade of Education for Sustainable Development

(DESD). It seemed there was a global appreciation of the significance of education to move in the direction of sustainability. Centre for Environment Education (CEE), the ENVIS Centre on Environmental Education leads our country in this programme and to achieve sustainable development CEE recognised new prototype which emphasized on:

- **Learning** rather than *teaching*
- **Lifelong and continuous** education rather than education *confined to a specified period*
- **Multi-sourced and accessed** education rather than *top down, controlled and orchestrated* education
- **Empowering** rather than *socializing (indoctrinating)*
- **Global yet locale specific** education
- **Capacity building** to build abilities for critical thinking and problem solving
- **Multi-disciplinary approach** as opposed to a *single new discipline*
- **Sensitivities to gender, diversity etc.,**
- **Participatory and based on learning with peers.**

These ideologies were well recognised long ago by Mahatma Gandhi in his words: “*Education for life; Education through life; Education throughout life.*” The challenges faced are to reach all the formal and other institutions with the techniques of EE and ESD. The challenge is to build more capacity to full-fill the targets of the decade and indeed those of the Millennium Development Goals.

3. ***Involving young minds for challenge solving:*** Youth have always been a major force in initiating change and must be involved in EE and ESD planning and decision-making processes. ‘Children and youth increasingly participate in sustainable development activities through non-formal education programmes and networks. Social networking sites, websites, newsletters, TV and radio are frequently used by youth organizations to disseminate information on environment, biodiversity threats and sustainable development issues.’(Joshi, 2005)

Government programmes for youth have begun incorporating sustainable development concerns. India's National Youth Policy (2003) places increased emphasis on environment and sustainable development issues and initiatives. Despite this progress, there are still significant opportunities to further incorporation of ESD into youth initiatives. Youth programmes require a clear strategy and institutional support for greater opportunities, constructive learning and involvement in ESD. The South Asia Youth Environment Network (SAYEN), located at CEE, promotes youth participation in sustainable development practices. Higher education institutions, NCC unit, NSS unit etc could also play a greater role in providing opportunities for youth involvement in environment related activities.

4. ***Enabling the increased use of bio-resources:*** To enable the increased use of bio-resources International and national policies regarding land management that permit or limit production practices; safety regulations, especially with regard to specific agrochemicals; subsidies that favour or limit the use of particular production practices; land and water rights, especially for small-scale farmers, rural communities and indigenous peoples should be reformed. Secondly, economic and market perspectives should be considered by developing markets for underutilized or wild species, using a wider range of genetic resources, development of totally new markets, stable supply of planting or breeding stocks, to adapt processing technologies and to set quality standards are also necessary. Community-based approaches should be considered by incorporating traditional knowledge in conservation and sustainable usage of bio-resources; recognizing the importance of bio-resources by local institutions organizing and managing local production and improvement of different ways to strengthen them is a essential. Sustainable diets are the diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and vital for biodiversity and ecosystems, it is culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; at the same time it is optimizing the use of natural and human resources.”

## **Conclusion**

With only 2.4% of the worlds’ land area, India accounts for 7 to 8% of the worlds’ plant and animal species. It is one of the 18 mega-diverse countries and contains four global biodiversity hotspots. India shows a high degree of endemism, which is why conserving biodiversity is essential for the future. As a developing country, its dependence on natural capital is more. Transforming these resources into other forms of wealth is essential for development, but it must be in a sustainable manner to ensure continued growth and the survival of the resources. Biodiversity conservation cannot be brought about only by enforcing law. Moreover assigning values to the priceless entity is an immense and urgent need. A holistic approach should be followed with implementation of regulations that reward conservation of ecosystem services or implicating methods of penalizing their destruction, and encouraging markets, which give economic value to the decision to conserve. Though, environment education is a compulsory subject in schools and colleges. Students are being taught mere facts and figures. We have to make our children realize that they are part of the problem, and therefore they have to be the part of the solution too. Apart from the above mentioned goal, the following should be considered:



1. Education of all the actors involved in production, marketing and consumption of bio-resources should be an important part of the process of changing production practices. Student should be involved in activity based learning such as designing projects centre upon needs of the communities. Interrelation between teachers, students and the curriculum is necessary. New ways of teaching and learning tools should be introduced like- games, classroom displays, performing arts, demonstration, exhibition, creative expressions, creative writing, arts and crafts, using the outdoors etc.
2. Agricultural production practices need to be changed, reducing the negative impact of agriculture on the environment while continuing to increase productivity and improve sustainability. It is essential to conserve species richness and genetic diversity within the species, to support sustainable development by protecting and using biological resources.
3. Knowledge about the needs of the target group is essential- which would help in designing an area- and essential- based project in correlation to everyday life of the individual. Collaboration between NGO's and Government Institutions having appropriate infrastructure and providing incentives to the participants and institutions in the form of ecosystem benefit sharing is also necessary.
4. Citizen action: individual and community initiatives- multi stakeholder involvement in the management of natural resources and evaluation is required. The need for the full participation of youth at all levels of policy making and implementation for biological resource conservation and sustainable use should be recognized.
5. Recognition of traditional practices and technology as an integral part of the strategies is essential. Above all an integrated system that is a blend of formal, non-formal, social, economic and sensitive approaches is needed to illuminate the young minds to solve biodiversity related environmental challenges.

The focus must be on reducing consumption, increasing sustainable use of bio-resources. Humans are the self-preserving self, so let's not think about other species of the planet, let's be the selfish ones, for our own benefits and interests 'let's care, save and share our wealth.

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